



Spectral Gamma-Ray Borehole
Log Data Report

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Borehole

20-08-03

Log Event A

Borehole Information

Farm : <u>B</u>	Tank : <u>B-108</u>	Site Number : <u>299-E33-193</u>
N-Coord : <u>45,330</u>	W-Coord : <u>52,707</u>	TOC Elevation : <u>652.99</u>
Water Level, ft :	Date Drilled : <u>3/31/1972</u>	

Casing Record

Type : <u>Steel-welded</u>	Thickness : <u>0.280</u>	ID, in. : <u>6</u>
Top Depth, ft. : <u>0</u>	Bottom Depth, ft. : <u>135</u>	

Borehole Notes:

Borehole 20-08-03 was drilled in March 1972 to a depth of 100 ft and was completed with 6-in. casing. The borehole was deepened to 135 ft during April 1973. Data from the drilling log and Chamness and Merz (1993) were used to provide borehole construction information. These references do not indicate that the borehole casing was perforated or grouted. The casing thickness is presumed to be 0.280 in., on the basis of the published thickness for schedule-40, 6-in. steel tubing.

Equipment Information

Logging System : <u>2B</u>	Detector Type : <u>HPGe</u>	Detector Efficiency: <u>35.0 %</u>
Calibration Date : <u>11/1997</u>	Calibration Reference : <u>GJO-HAN-20</u>	Logging Procedure : <u>MAC-VZCP 1.7.10-1</u>

Logging Information

Log Run Number : <u>1</u>	Log Run Date : <u>12/04/1998</u>	Logging Engineer: <u>Alan Pearson</u>
Start Depth, ft.: <u>133.5</u>	Counting Time, sec.: <u>100</u>	L/R : <u>L</u> Shield : <u>N</u>
Finish Depth, ft. : <u>55.0</u>	MSA Interval, ft. : <u>0.5</u>	Log Speed, ft/min.: <u>n/a</u>

Log Run Number : <u>2</u>	Log Run Date : <u>12/07/1998</u>	Logging Engineer: <u>Alan Pearson</u>
Start Depth, ft.: <u>0.0</u>	Counting Time, sec.: <u>100</u>	L/R : <u>L</u> Shield : <u>N</u>
Finish Depth, ft. : <u>56.0</u>	MSA Interval, ft. : <u>0.5</u>	Log Speed, ft/min.: <u>n/a</u>

Log Run Number : <u>3</u>	Log Run Date : <u>12/07/1998</u>	Logging Engineer: <u>Alan Pearson</u>
Start Depth, ft.: <u>60.0</u>	Counting Time, sec.: <u>100</u>	L/R : <u>L</u> Shield : <u>N</u>
Finish Depth, ft. : <u>45.0</u>	MSA Interval, ft. : <u>0.5</u>	Log Speed, ft/min.: <u>n/a</u>



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Logging Operation Notes:

This borehole was logged in two log runs. A third log run was performed from 45 to 60 ft for a data quality check on the logging system. The top of the borehole casing, which is the zero reference for the SGLS, is approximately even with the ground surface. The total logging depth achieved by the SGLS was 133.5 ft.

Analysis Information

Analyst : P.D. Henwood

Data Processing Reference : MAC-VZCP 1.7.9

Analysis Date : 01/29/1999

Analysis Notes :

The pre-survey and post-survey field verification for each logging run met the acceptance criteria established for peak shape and system efficiency. The energy calibration and peak-shape calibration from the accepted calibration spectrum that most closely matched the field data were used to establish the peak resolution and channel-to-energy parameters used in processing the spectra acquired during the logging operation.

A casing correction factor for a 0.280-in.-thick steel casing was applied to the concentration data during the analysis process.

Shape factor analysis was applied to the SGLS data and provides insights into the distribution of Cs-137 contamination and into the nature of zones of elevated total count gamma-ray activity not attributable to gamma-emitting radionuclides.

Log Plot Notes:

Separate log plots show the man-made and the naturally occurring radionuclides. The natural radionuclides can be used for lithology interpretations. The headings of the plots identify the specific gamma rays used to calculate the concentrations. Uncertainty bars on the plots show the statistical uncertainties for the measurements as 95-percent confidence intervals. Open circles on the plots give the MDL. The MDL of a radionuclide represents the lowest concentration at which positive identification of a gamma-ray peak is statistically defensible.

A combination plot includes the man-made and natural radionuclides, the total gamma derived from the spectral data, and the Tank Farms gross gamma log. The gross gamma plot displays the latest available digital data. No attempt has been made to adjust the depths of the gross gamma logs to coincide with the SGLS data.

The interval between 45 and 60 ft was relogged as a quality assurance measure to establish the repeatability of the radionuclide concentration measurements. A separate log plot showing the radionuclide concentrations that were calculated using separate data sets provided by the original and rerun logging runs is included.

A plot of the shape factor analysis results is included. The plot is used as an interpretive tool to help assess the radial distribution of man-made contaminants around the borehole.

Results/Interpretations:

The only man-made radionuclide detected in the borehole was Cs-137. The Cs-137 contamination was



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detected continuously from the ground surface to 13.5 ft and from 17.5 to 21 ft. Shape factor analysis indicates the contamination is distributed in the backfill material near the ground surface and becomes more localized to the casing with depth. An interval at about 5 ft suggests the occurrence of a remote source, such as a pipeline.

The K-40 concentrations increase at about 40 ft and remain elevated to the bottom of the logged interval.

Additional information and interpretations of log data are included in the main body of the Tank Summary Data Reports for tanks B-105 and B-108.